THE ELECTRICAL WORLD

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The Electric Lighting System of The Excelsior Electric Company—III.

(*Continued from page* 10.)

THE EXCELSIOR ARC LAMPS.

The standard type of arc lamp used by the Excelsior Electric Company for ordinary installations is shown in Fig. 10. The plan of construction of this lamp is that which has been found most practical and which has been generally adopted by electricians, namely, to make the lower (negative) carbon fixed, and to let the upper carbon feed itself by its own weight, the motion being controlled and regulated by suitable electrical and mechanical devices. The design of the lamp is entirely new, however, and the regulating mechanism differs materially from that of all other arc lamps.

An interesting feature of this lamp is that the frame is insulated from all parts of the mechanism through which current has to pass. The lamp may therefore be touched anywhere on the outside with absolute immunity from shocks. There are no binding posts. The terminals of the lamp consist of two well insulated wires issuing

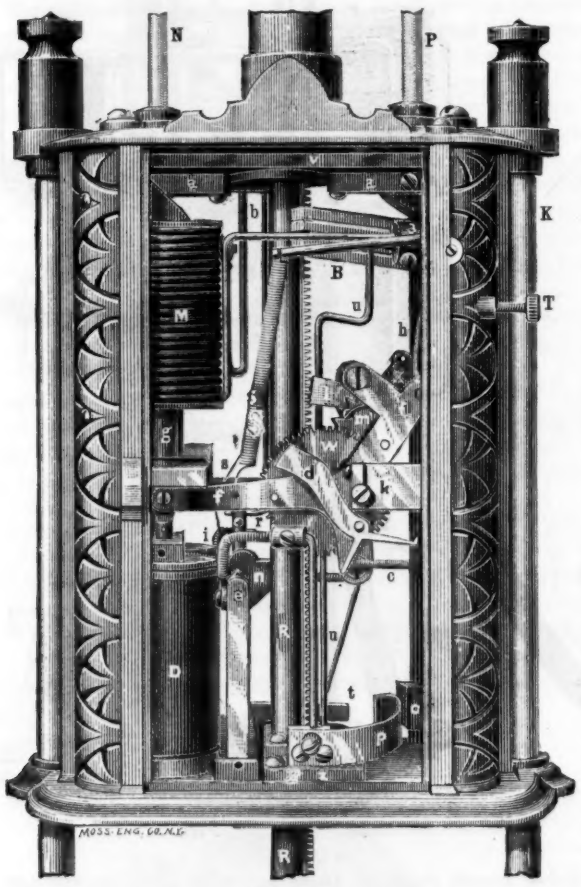

FIG. 11.

from the top of the regulator mechanism, from which they are insulated by vulcanite sleeves. They pass through similar sleeves in the ends of a small yoke fastened to the tube which serves to protect the carbon rod. The free ends of these wires can be bent and cut to meet the circuit wires, and the connections may be made by the use of ordinary couplings. The case inclosing the regulator mechanism is ornamented with monograms, and richly bronzed. The suspension rods which support the lower carbon and the glass globe consist of iron rods enameled with a covering of glazed white porcelain, which not only insulates them effectively but gives them a finished look. These suspension rods pass down close to the carbon rod in a line with the outer margins of the case of the regulating mechanism, from which they are insulated by vulcanite bushings. They are held in place at the top by knobs of vulcanite, as more perfectly shown in Fig. 11. This closeness of the suspension rods allows the globe to be fitted around them, and thus the lamp assumes a simple, compact form, which relieves it considerably from the cumbrousness noticeable in many arc lamps, and to which many users of the arc light object. The globe itself may be removed without danger, or without interfering with the light. The ornamental holder or pendant to which it is attached holds it in place by a kind of bayonet joint. To remove the globe it is only necessary to rotate the holder and then to pull it down. It is not attached directly to the yoke uniting the two enamelled rods and carrying the lower carbon, but to a second yoke depending from the first, and insulated from it by porcelain sleeves which surround the bolts that hold it in place. This will perhaps be understood more readily from Fig. 12, which shows the double lamp taken somewhat larger, with the globe removed. The clamp for the upper carbon is attached to the rod by a ball and socket joint, so that the carbons may be readily placed in line. In arc lamps adapted to be used in series, the regulating mechanism is controlled by a "differential action" between two opposing forces, one of which tends to separate the car-

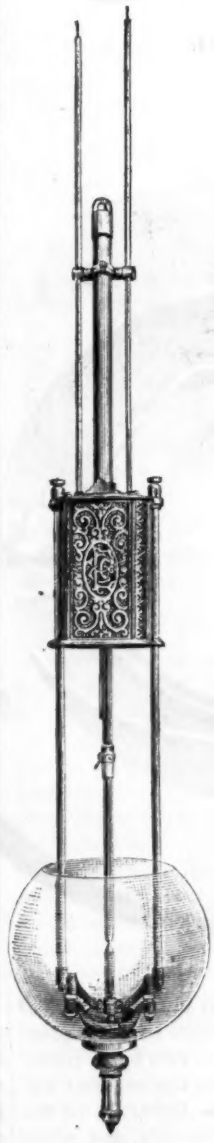

FIG. 10.

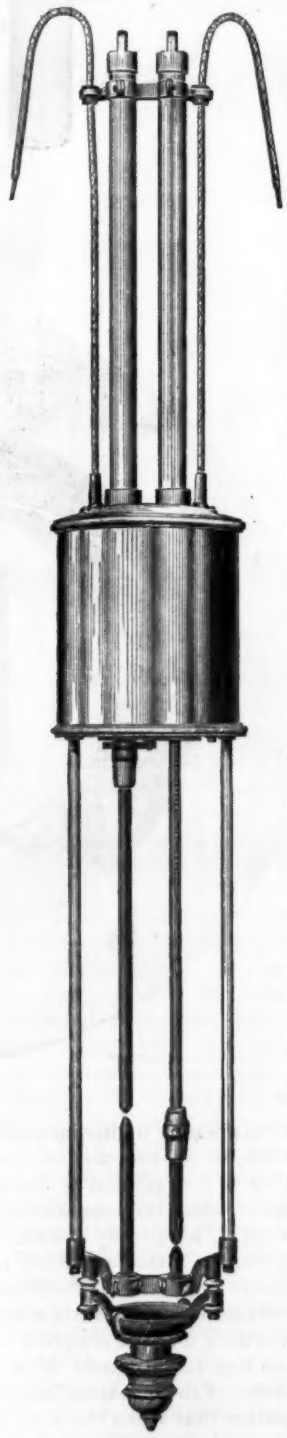

FIG. 12.

bons, and the other to bring them together. In the Excelsior lamp there is such a differential action, but it is different from that met with in other lamps; the force which tends to produce the separation is derived from a *spring* and not from a magnet or solenoid included in the main circuit, as is the case in other lamps. There is a main circuit magnet in the regulator, but its office is merely to release the spring when the current is put on, by removing a weight (the armature) that holds it down.

Fig. 11 shows the regulating mechanism of the single lamp in side elevation, the side panels of the case being removed. In the upper portion of the case is a flat piece of vulcanite *v*, to which are fastened two pieces of brass *a a*, which serve to make the connections between the terminal wires *P N*, and other portions of the lamp circuit. The right-hand piece receives the current from the positive terminal wire *P*. The carbon rod *R* passes down through a hole in this piece, and thus forms contact with it and receives current. It also receives current through a brass comb brush *B*, connected with piece *a*. At the bottom of the case the carbon rod passes through a piece of brass also resting on vulcanite insulation *z*. From this piece of brass, which is thus directly connected to the positive terminal, there is a wire passing up and leading to the fine wire solenoids *D*, as shown in the figure. The brass spring *p*, which forms part of the switch, is also attached to this brass piece. The current after passing through the arc, returns upward by the right-hand suspension rod as far as *K*, where it enters through a wire leading to a coupling 3. From this coupling there is a branch which goes to the main circuit solenoids *M*, from which a wire *b* leads to the left-hand piece *a*, and consequently to the negative terminal wire *N*. The brass piece *t* is connected with a brass post on the further side of the lamp and the upper end of which is seen at *r*. This brass post is connected with the negative terminal by a wire seen passing up close to the left side of the carbon rod. To this wire is connected the other end of the solenoid *D*, which, as we see, forms a derived circuit around the arc. The piece *t* is connected

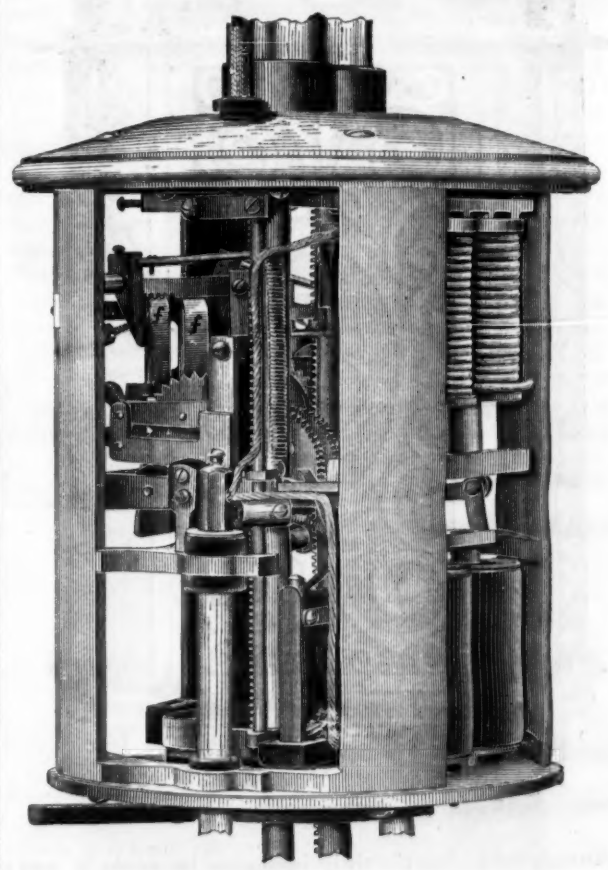

FIG. 13.

to the circuit on the negative side of the arc, while the spring *p* is connected on the positive side. Hence, by pressing the spring into contact with *t* the lamp becomes short-circuited. This arrangement, therefore, furnishes a simple switch. The spring is pushed into contact by an arm of vulcanite *o*, which is swung round by a lever or key conveniently disposed below the case.

The feed mechanism is quite simple. The carbon rod is provided with a rack which gears into a small pinion This pinion is not shown in the figure, for it is on the same shaft as the toothed wheel *W*, and therefore hidden by the latter. The pinion is insulated from the shaft and from the wheel *W*, however. It is fitted on a vulcanite sleeve, and held in position by being fastened to a vulcanite disc on the wheel *W*. By this insulation the current passing through the carbon rod is prevented access to the mechanism and to the case. On this side of the escapement wheel *m* is a ratchet-wheel not shown in the engraving. This ratchet wheel is fastened to a sleeve on the shaft of the wheel *m*, together with a pinion gearing with the wheel *W*. The teeth of the ratchet wheel are so directed that when the carbon rod is moved upward it slips on the shaft of the wheel *m*; but when the carbon rod descends it engages the escapement wheel *m*, which operates the escapement *x* fastened on a common shaft with a long "fan" partly shown in white

near *h*. The little white dot above the escapement shows a pin that controls or checks the movement.

The framework *f f* of the escapement mechanism is itself pivoted at *k*, and can be swung bodily from right to left. The Ω-shaped armature of the solenoids *D* is attached to the left end of this framework, and moves up and down at the same time. The spring *S* normally tends to lift the left side of the framework, or, in other words, to make it swing from left to right. As long as no current is passing through the coils *M*, however, the weight of the armature *g* counteracts this spring and holds down the left end of framework *f*. In this situation the escapement *x* is freed from the escapement wheel *m* by the lever *l*, which is tilted upward and moves the escapement shaft to the right. The object of this release of the escapement wheel *m* is to allow the carbon rod *R* to move down the moment the current is cut off from the lamp, so as to close the circuit through the carbons again.

When the current is sent through the lamp it passes through the carbon circuit including the solenoids *M*, and also in smaller proportion through the fine wire solenoid *D* in derived circuit. The two vertical cores of the armature *g* are sucked up into the solenoids *M*, and the weight counteracting the spring *S* is released. The framework *f* is therefore moved. As soon as it begins to move, the lever *l* tilts back again, causing the escapement *x* to engage the wheel *m* once more. The further motion of the framework causes the carbon rod to be raised bodily, so as to cause separation between the carbons and establish the arc. But as the weight of the carbon rod would move the train of wheel and cause the escapement *x* with its attached fan to beat to and fro, the carbons would soon touch again. This is prevented by a weighted lever *d*, which catches the lower end of the fan and stops its motion. As the framework *f* is moved under the influence of the spring *S*, the pivot of this lever moves toward the left. This has the same effect as if the regulating screw *e* were moved out of its way to the right. The hooked portion consequently tips upward and engages the lower end of the fan.

As long as current passes through the lamp, the cores *g* remain attracted by the solenoid *M*. The framework does not necessarily move to this extent, however, because the spring *S* is now opposed by the solenoid *D*, and as the current diverted through the latter increases directly with the length of the arc, a point of equilibrium is reached where the spring is balanced by the attraction of the solenoid *D*. As the carbon consumes the arc lengthens, and this leads to an increased diversion of current through *D*, which overpowers the spring *S* and pulls down the framework. This has the effect of moving the lever *d* against the screw *c* so as to release the escapement fan, which begins to vibrate. After a few teeth of the wheel *m* have "escaped," perhaps, the arc has regained its normal length, and as the shunt solenoid *D* has thereby become weakened, the spring *S* is released so that the framework again moves upward. If the spring *S* has its tension increased, then the arc will be longer, because it will require a greater diversion of current through the shunt *D* to overcome this tension. The tension of this spring may be readily adjusted by means of a screw *T*, which is shown on the outside of the case. The differential action is produced, as we see, between the spring *S* and solenoid *D*. As we stated above, the main circuit solenoid *M* serves only to release this spring.

Mr. Hochhausen has added an interesting form of automatic cut-out to this lamp, to provide for its extinguishment in case it fail to feed from any cause. Behind the vertical post *e* is a supplementary armature, which is acted upon by undue increase of current in the solenoid *D* when the arc becomes too long. It consists of a flat piece of sheet iron pivoted at the top between two brass posts, one of which (*r*) is connected by wire with the negative terminal *N*, as already shown. Under the influence of the current in *D* this armature is tilted to the left, and when the arc acquires an abnormal length the attraction proceeds until the armature touches a contact piece connected by wire *u u* to the coupling 3. By this means it will be seen that the solenoid *M* is short-circuited. The tilting motion of the armature has placed a flat spring *s* in such a position that when the core *g* falls down, being no longer attracted, it presses this flat spring against a contact connected with the positive pole, thus short-circuiting the lamp.

The same mechanism is also depended upon to short-circuit the lamp when the carbons are consumed. For this purpose the carbon rod is provided with a small spring projecting from its surface at the upper end. When the carbon rod has descended sufficiently this engages against a piece of vulcanite *n* attached to the supplementary armature, and causes the armature to tilt, with the effect of short-circuiting the lamp in the same way as before. The regulating mechanism of the double lamp (Fig. 13) embodies the same principles of construction. The main difference is that in this case there are two escapement mechanisms, both carried by the same framework, one for each carbon rod. The escapements and fans (*f f*) are engaged and released in both at the same time, but there is always one carbon rod which is prevented from descending. The device by which this is accomplished is shown in Fig. 14. The left-hand carbon rod *A* is prevented from descending by a pin *a* resting against the end of a bell crank lever *e d*, which is held forcibly against it by a spring *S*. The other carbon rod *B*, however, is free to descend. The arc is therefore produced on this side, the other carbon being held at a slight distance, out of contact. When the carbon rod *B* has descended quite down, a little pin *b* comes against the other end of the crank lever and moves this lever into a position represented by the dotted lines, thus allowing carbon rod *A* to slip down. The carbons on this side (*A*) now come into contact, and the arc at *B* dies out. The regulator now causes the separation between this new set of carbons, the carbon rod *B* remaining suspended by the pin *b*. The switch and the automatic cut-out just described are used in this lamp. In this case the second carbon rod (*A*) is provided with a pin at the upper end so as to tilt the armature of the cut-out and short-circuit the lamp when the second set of carbons is consumed.

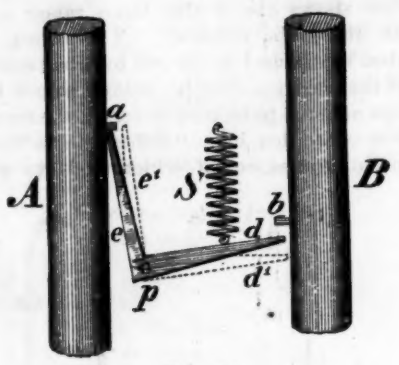

FIG. 14.

FIG. 16.

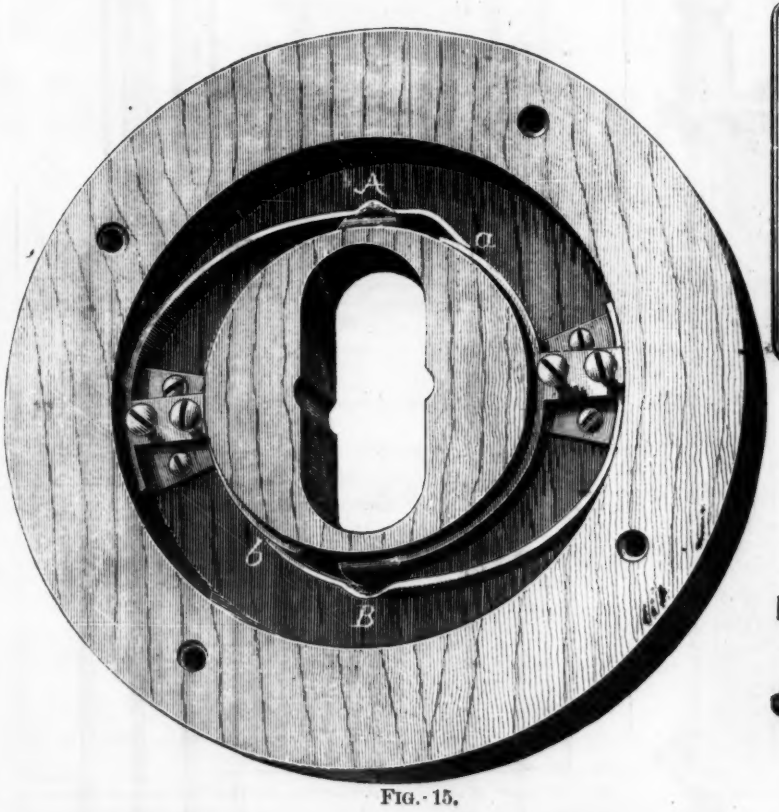

FIG. 15.

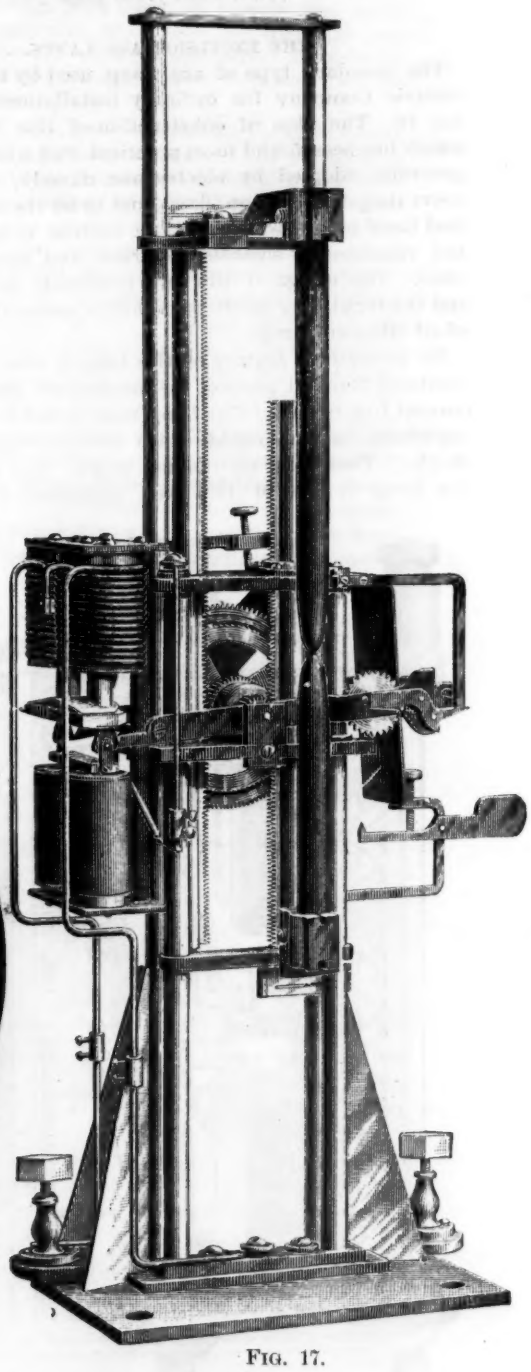

FIG. 17.

These lamps regulate their arc with great nicety and precision. Their operation seems to be about as satisfactory as that of any lamp we have ever examined. Clockwork mechanisms for arc lamps are necessarily more complicated than clutch mechanisms, but there is no undue complication in this case, considering the variety of functions to be performed. The mechanism is not of a delicate description, and is therefore well adapted to stand wear and tear and the effects of the weather. One good idea we must mention, by the way, is that the cores of the solenoids are tinned so as to keep off rust. The arc maintained is about an eighth of an inch long, and the light is extremely steady, the slight variations observable being due seemingly to impurities in the carbon. The carbons used are seven-sixteenths of an inch in diameter, and with the current of ten ampères usually maintained in circuit, the crater in the positive carbon is well defined and clean. Mr. Hochhausen has devised an ingenious bracket and switch (Fig. 15), by means of which a lamp may be readily put in the circuit or taken out, the connections being made automatically. It consists of a disc of wood which is screwed to the ceiling. In the centre is an opening to admit the carbon rod tube. Inside of a concentric groove are the connections. The wires from the circuit are connected to metallic pieces screwed into this groove, one on each side. From the left piece extends a spring *A*, which makes contact at *a* with a brass strip extending from the right-hand piece. From this piece extends a similar spring *B*, making contact at *b* with a strip from the left-hand piece. As long as the contacts *a*

and *b* remain as they are the circuit is closed. But now, if we insert the terminal wire *P* (Fig. 11) into the round bend in the spring *A*, while terminal wire *N* is similarly placed into the corresponding depression in *B*, the wires will evidently force the springs out of contact with *a* and *b*, while at the same time the lamp will receive the

FIG. 18.

current. The spring *A* will be in contact with one terminal, and the spring *B* with the other terminal. Fig. 16 shows a double lamp suspended by such a switch-bracket. To hang the lamp the wires are cut off to a short distance from the top of the case, and the lamp is pushed up into place. It is held suspended by two hooks, which reach over the upper side of the elliptical opening, as seen at *e*. On pushing these hooks back, the lamp slides down and out, while the circuit is of course closed by the springs at *a* and *b*.

Fig. 17 shows a focusing regulator for steamboat search lights, locomotive headlights, or other purposes where the arc light is used, with a parabolic reflector for projecting a beam of light in one direction. In regulators of this description the same mechanism has to control the two carbons, and make the lower one feed upward while the upward one feeds downward, so that the arc may always remain in the focus of the reflector. In this case this result is attained by an easy modification of the regulating mechanism of the standard arc lamp. The carbon rods both have racks, and they gear into pinions carried on the same sleeve, though insulated from each other.

They are placed on opposite sides of the shaft, and therefore the downward motion of the positive carbon rod causes the upward motion of the negative carbon rod. The upper carbon consumes twice more rapidly than the lower, and for that reason the pinion of its carbon rod is of a diameter twice larger, in order that it may feed down twice as fast as the lower one feeds up. These pinions are fastened to a ratchet wheel which slips on the shaft of the large toothed wheel when the carbons are moved apart, but engages this wheel when the carbons are released. This toothed wheel gears into the pinion of a shaft carrying the escapement wheel. When no current is passing through the lamp the weight of the upper solenoid core tilts the framework of the mechanism as in the standard lamp, and in this situation also the escapement is freed by a small lever.

FIG. 19.

When the current is passed through the lamp the framework is tilted in the other direction by the spring, and the escapement is again engaged. The lower end of the fan also is moved down by this tilting movement until it is impeded and stopped by a small hooked lever shown in the figure. The operation of this regulator is therefore the same as in the standard lamp. The carbon clamp of each carbon rod is attached to a transverse piece sliding on two vertical posts and fastened to the rod. In this way the carbons may be placed at a distance from the body of the regulator, thus leaving room for placing a reflector behind the carbons.

INCANDESCENT LIGHTING APPARATUS.

The Excelsior Electric Company seems to have come to the conclusion that the incandescent light has its sphere of usefulness as well as the arc light, for it has lately given considerable attention to the subject of incandescent lighting. Besides making shunt-wound dynamos specially adapted to this purpose, the company proposes to manufacture its own incandescent lamp and accessories. This lamp (Fig. 18) differs from the others in the form given to the carbon loop, which, in this case, assumes the semblance of a letter T. This form of loop is preferable to any other form we have yet seen, for it makes the light-producing focus seem more spherical. The carbon loop is formed of vegetable fibre of a peculiar kind, which is found to last remarkably long. The weak spot in incandescent lamps is generally in the imperfect connection between the wires passing through the glass and the carbon filament. It is claimed that in these lamps the connections are made in an improved manner which leaves nothing to be desired.

Fig. 19 shows a plain form of holder used with these lamps. The three bent wire springs embrace the lower portion or neck of the lamp, and the small platinum wires protruding through the glass are pinched between the split extremities of the circuit, connecting by means of screws, one on each side. Fig. 20 shows one of these holders mounted on a hand-stand and supporting an Excelsior incandescent lamp. In Fig. 21 we have a more ornamental form of holder, in which the bent wire springs are replaced by sheet brass springs, forming part of a casing.

The device represented in Fig. 18 is called an "automatic substituter." The circuit is divided at first into two branches, one of which includes the electro-magnet shown

FIG. 20.

in the base, together with one of the lamps. The other includes the other lamp, but remains closed only as long as the armature is retracted. When the current is put on, therefore, as soon as the magnet is excited, the second circuit is opened and only the first lamp remains in circuit. If this lamp breaks, however, the armature instantly falls back and closes the circuit through the second lamp. There are many situations where it would be very desirable to have the incandescent light in connection with the arc light. For instance, there are often places where a few incandescent lights would be more convenient and useful than one arc light. To meet this want attempts have been made to run incandescent lights in the same circuit with arc lights. For instance, it seems quite plausible that if the current in circuit is ten ampères and each incandescent lamp requires a current of one ampère, by dividing the circuit into ten branches, each of which includes a light, the lamps ought to burn successfully. But the trouble is that if one lamp breaks the nine others will receive the ten ampères among them, or each will receive one-tenth of an ampère more than is "healthy" for it. This may lead to the rupture of another, and this again causes an increase of one-tenth of an ampère. In short, the breakage of one lamp endangers the rest, and, according to our experience, it generally causes their total destruction, thus suddenly breaking the circuit. This is evidently unpractical.

Mr. Hochhausen, however, has attacked the problem anew, and he has indeed produced a very ingenious solution of it, the principle of which is simple enough. When a lamp breaks or is cut out, he proposes to shunt the surplus current through an equivalent resistance. If two lamps break he diminishes this resistance. Finally, if there is danger that the lamps may burn up altogether, they are all cut out of the circuit. These results are all accomplished by means of an automatic regulator (Fig. 22).

The switch shown on the right-hand side is normally pulled toward the cover by a spring not shown in the figure. In this condition, the incandescent lamps are cut out of the arc light circuit. The contact piece nearer to the cover of the case is connected to the armature of an electro-magnet within. This electro-magnet is included in the main circuit, and when the current is passing it attracts its armature, and causes the contact piece outside the case to project out from the surface of the case. If, now, the switch is moved to the right, it is prevented from moving back by the insulated end of this protruding contact. In this condition, the incandescent lamps are included in the circuit—that is to say, the circuit divides at one point into several branches, in which are included the lamps—one in each branch. But there is one of these branches which, instead of a lamp, includes a relay magnet of rather high resistance. Now if a lamp breaks the current

FIG. 21.

increases in all the remaining branches stated above. The relay feels this increase, and its armature comes against a contact which closes the circuit through another branch, including an equivalent resistance placed in the case, and consisting of wire wound on wooden reels, every turn of the wire being accessible to the air so as to admit of ready cooling. If now another lamp breaks, the armature of the relay is attracted further, and closes a circuit through a lamp placed on top the regulator case to warn the attendant, who immediately proceeds to replace the two broken lamps. But meanwhile another lamp still may break, and as the relay cannot make further compensation there is imminent danger that the other lamps will break. This is prevented by a kind of automatic cut-out. The relay is provided with a supplementary armature, which is attracted when the current increases beyond the limit compensated for by the relay itself. The motion of this armature short-circuits the electro-magnet in the main circuit, whose function is to make the contact piece protrude on the outside of the case. Instantly this contact piece moves back close to the surface of the case again, and the switch is quickly pulled back by its spring. As soon as it touches the metallic surface of this contact once again the incandescent lamps are short-circuited and the arc lights are left alone in the circuit. It is evident that the principle of this regulator may be extended not only to one but to several multiple series, and the number of lamps compensated for may be regulated quite easily. The only objection that can be made against this mode of regulation is that there is no economy of energy when only a few of the lights are burning, because the compensating branches absorb the energy previously expended in the lamp in producing light. However, as the number of lights accidently put out would usually represent only a trifling proportion of the total in use, this objection is not serious. Besides, in cases where this procedure is resorted to, expediency or convenience is generally a more important consideration than economy. It may interest some of our readers to know that the incandescent lamps we used in some of our tests and experiments had an average resistance of 80 ohms cold and approximately 40 ohms when hot. In conclusion we wish to express our thanks to Mr. Hochhausen, electrician of the company, Mr. Oswald, his assistant, and to Mr. Geo. D. Allen, general manager, for courtesies received and facilities placed at our disposal in the preparation of these articles. ***

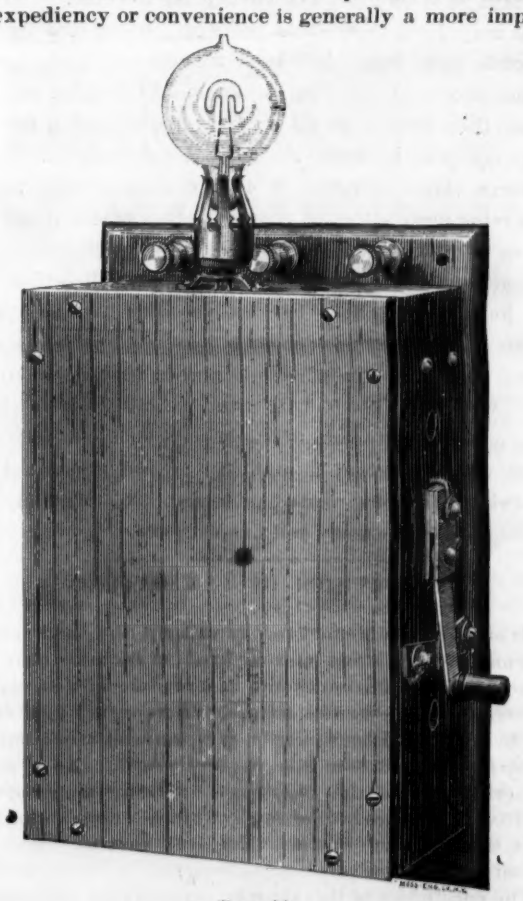

FIG. 22.

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ELECTRIC LIGHTING SYSTEMS.

We bring to a close in this issue an elaborate, careful and accurate description of the Excelsior Company's system of electric lighting. It is the first of a series that we propose to publish on the various systems before the public, and we think we can with justice claim that it is the best that has been published, at any rate on this side of the Atlantic. From it a very favorable opinion will be formed as to the merits of the articles to come.

It may have seemed to some of our readers that the electric light has of late been treated with undue prominence in our columns, but a moment's reflection will convince them that, after all, we have maintained a satisfactory equipoise between the various departments. At the present time, however, it is the electric light that is receiving more attention than any other practical development of the science at the hands of electricians; and when inventors are so active in one direction, we, as journalists who wish to present to the public a fair and full record of what is done, must perforce work along the same lines. While paying attention to the achievements in electric lighting, we have not neglected the other departments of electricity, and our index for 1883 will show that a majority of the illustrated and descriptive articles related to telegraphy, telephony, the transmission of energy and like subjects.

THE ETHICS OF COMPETITION.

It is a remarkable fact that in this country, which offers a wider field to effort in every kind of industry than any other, the competition should be more intense than abroad. Where the opportunities are so numerous, it might be expected that rivalries would become lax and rare; but the contrary is the case in this western world. As a people Americans have the reputation of being the most competitive and aggressive of modern times; and candor compels the admission that we deserve all that has been said about us in this respect.

The corollaries of this sharply accentuated competition are the tendency toward monopoly and the resort to unfair methods of beating down and supplanting a rival. At bottom it is as much fear of competition as love of wealth that leads to the concentration of control in one man or a few men associated together. If Gould, Vanderbilt, Huntington, Rockefeller, Field and other men of like calibre were put out of existence to day, their places would be taken to-morrow by others who were able from various reasons to protect vast telegraph, railroad or other properties against competition, by crowding opponents out of the field. No matter what laws may be enacted, so long as Americans throw themselves with ardor into the arena of competition, these monopolies will continue to grow up. And whether they remain as a part and parcel of our civilization or not, it is to be feared that dishonest practices, ranging from the adulteration of fabrics to the bribery of judges, will be incidental to the fierce competition that is developed every day among us.

The electric light business and the telephone business are good examples of competition and lack of competition, respectively. The telephone is a monopoly, while electric lighting is in a measure free to all. Yet hundreds, and perhaps thousands, spend most of their time planning how they can annihilate the American Bell Telephone Company, while those engaged in electric lighting complain that competition makes the business less remunerative than it ought to be. It seems, therefore, impossible that a state of affairs can be had which will give perfect satisfaction to everybody. The milenium not yet having arrived, we presume there is nothing for us but to worry along as we are. If somebody else has secured a monopoly in a particular line we must put our money and energies into something else. If after we have done that somebody arises to contest the field with us, it will be better for us to accept the situation as gracefully as we can and endeavor, by acting honorably and giving better service, to secure a larger share of the business than he does.

It sometimes seems as if a local electric light company does not receive as considerate treatment as it deserves. The inventor of a new device may be protected in the exclusive manufacture of such invention for a term of years. He may have spent but little time or money on the invention, while the electric light company may have been the pioneer in its locality, and have gone in where timid capitalists feared to tread. It may have staked largely, its officers and shareholders placing their whole fortune in its development. It may have educated the public up to the use of electric light, and may have conferred a boon by lessening the number of midnight burglaries, brawls and murders. These things, however, avail it but little. As soon as it gets fairly under way and is making money a competitor may come along with some other system, and the business, which would have insured one company a satisfactory return on its investment, is cut up between two, neither of which makes much money. Prices are cut, too, by the new-comer, for the purpose of drawing business away from the older company. Not content with that, serious charges are made against the older company by the one that wishes to supplant it. These, of course, have to be met and refuted, and the result is a bitter rivalry not very creditable to the cause of electric lighting. Even the public do not seem to think that the pioneer company deserves any consideration at their hands. They seem to delight in encouraging competition. If they would think a moment they would see that a monopoly of electric lighting is impossible and that it would be much better if the city had but one electric light company and that in a prosperous condition, lighting the city in a manner that all might be proud of, than to have several, each fighting for supremacy and none of them either doing creditable work themselves or allowing their competitors to do it.

This is one aspect of the case. We, however, take a liberal view of competition. We like to see it, and while in some instances it may work injustice, and under its guise unscrupulous persons may harass and annoy those who are conscientiously trying to do their duty, still, we believe that much good results from competition. Subscribers feel more satisfied, because they consider that the rivalry will prevent prices from being exorbitant. The new company, too, may be able to do much toward demonstrating the superiority of the electric light, and in this way many will come to use it that otherwise might not. Business will therefore increase and both companies can go on and develop without either one doing it at the expense of the other. Would it not be better for the competing companies each to devote itself to its own business, without expending time or patience trying to run down the system of the other? By working harmoniously together they would certainly accomplish more. Bickerings and abuse will have little effect in driving your competitor out of the field, and false charges are sure to injure those making them far more than they do those against whom they are aimed.

Electric lighting is not the only branch of business in which the same conditions exist. It may be some consolation to bear that in mind. In journalism, for instance, there goes on incessantly a struggle for the survival of the fittest, and, much as journalists are occupied in telling other men how to govern their lives aright, some of them indulge occasionally in courses that cannot be approved by the highest ethics of competition. The province of journalism does not know of any such monopolies as that enjoyed under the Bell telephone patents. As in the case of electric lighting, the most unrestricted competition has gone on. No daily newspaper, no periodical, has ever yet learned the secret, should there be one, of shutting up the public to the patronage of itself alone. In every case the motives that secure readers to a journal must be those of merit and persuasion, not those of compulsion. More than that, a journal cannot live upon traditions of bygone excellence, but must persevere with more than pristine vigor in the line it has marked out. It is open to attack and competition from any quarter at any moment, and cannot tell from one day to another what efforts are to be made to undermine it, what unfair blows will be aimed in the dark at it.

Whatever business one may engage in, he is almost certain to have competitors. So long as the competition is fair and above-board an honest man or an honest company will have little to fear, and there is some comfort in the reflection that the career of those who do not show themselves to be honest and upright is not usually either very long or very successful. Those they do business with soon find it out, and they are lost sight of while their competitors go on. There is no reason why honest competitors—each believing his system to be better than that of the other—may not occupy the same field in unity and act in a perfectly frank, manly way toward each other. Of course this presupposes that each is inclined that way. It requires two parties to such a compact. Where an understanding of that kind can be arrived at, however, we believe it will be to the best interests of both to adopt that view of the case, and each try to bring himself to think that the system and the method of doing business of the other are not so much inferior to his own; that, after all, his competitor has a right to do business, and so long as his company makes a satisfactory profit—fully as much as it would if there were no competitor—the fact of somebody else also making money in the same field ought not to cause him any uneasiness.

HOW THE T. M. B. A. MAY BE ENRICHED $250.

As a rule we are perfectly satisfied to attend to our own business without minding what our competitors may do. Fair, legitimate competition we never object to, as we know that when that is offered to us we can, as heretofore, meet it with the utmost equanimity and maintain the lead that we have gained by honest journalistic and business management. We have often said before that instead of disliking competition we have not the least objection to it. It is perhaps due to competition that we owe many of our successful efforts, as we were thus induced to find out just how much we could accomplish in any given line.

The progress of the arts and sciences depends so largely on generous rivalry that we would be the last to oppose it when it is brought to bear upon electrical literature and journalism.

Occasionally, however, we have had to complain of what has seemed to us like manifest unfairness, to put it mildly, by would-be rivals who were jealous of our success. We have treated the matter good-naturedly and propose still to do so, when, as now, we call attention to some extraordinary statements made by contemporaries in electrical journalism. If it were the endeavor to draw away in an underhand manner talent now employed on THE ELECTRICAL WORLD we might, as hitherto, pass it over with silent contempt, regarding the unsuccessful attempt as a tribute to the care and wisdom displayed in the selection of our staff, and an unmistakable acknowledgment of the opinion entertained of it by competitors. If it were unfounded misrepresentations made to advertisers with a view to divert business from this journal; if it were the persistent imitation of our proceedings and the deliberate adoption of our programme—not to mention unmanly and ungentlemanly efforts to forestall us and to injure our honestly-earned reputation—we might again leave the matter to the observation of the electrical public, which knows good work when it is done, and knows, too, in which quarter the initiative has been taken. But when it comes to Munchausen yarns about circulation, advertising patronage and influence, we like to call attention to the brilliant flights of imagination.

We have a contemporary which began by selecting a name as near that of this journal as it very well could. It seems to think—as, indeed, do others—that THE ELECTRICAL WORLD is a model in its way. Whatever we do our admirer immediately, provided no extra expense is involved, endeavors in its own way to follow. It republishes items from us without credit, and even copies bodily whole advertisements of ours—for instance, the one about binders. This shows good taste and discrimination, but such a paper should not make the ridiculous pretensions our faithful follower does in a recent issue.

We gave some little idea as to what we proposed doing in THE ELECTRICAL WORLD during 1884. Our contemporary felt called upon to follow our example, and in its very next number made several remarkable statements. We copy one or two of them because, coming from such a source, they are the richest reading we have seen in some time, and will, we know, be thoroughly enjoyed and laughed over by electricians.

The article, after stating that the paper in its present form is but ten months old, adds: "The words of encomium which have been lavished upon it would, were we not too modest to record them." * * *

This is a sample of the "modesty":

"We have placed before our readers at the earliest possible moment the latest and most important intelligence of electrical progress, to a great extent accompanied by carefully prepared drawings, and can truthfully say we have never considered the cost. Conducted on this plan the ——— has kept so far ahead of all competitors that,

were it not for occasional clouds of dust to be seen rising far behind in the distant roadway, we should not be aware of the fact that there were any rivals in the field on this side of the Atlantic."

Comment regarding the above exhibition of modesty would seem to be superfluous, but if this be the utterance of a "modest" journal, what in the world would we expect from one laying no stress upon its alleged "modesty"? "We can truthfully say we have never considered the cost," is particularly good. Might not that be translated thus: The "carefully prepared" drawings we use are such as are furnished us free. We go to no expense ourselves for original drawings. If the manufacturer will not supply us with cuts, etc., he can't expect us to "consider the cost" of such things.

In the same article appears the following additional remarkable statement:

"The edition now being printed amounts to very nearly *eight thousand copies weekly.*"

The italics are not ours. This gives us pause. The only possible interpretation of it—for it is so worded as to need interpretation—is that the journal in question wishes to have its advertisers and others believe that it now prints a regular weekly edition of 8,000 copies, and that as 8,000 copies are printed each week there must be an equal number of subscribers, since no one could afford to go on week after week sending out "sample" editions of that size.

This reminds us of an incident that occurred years ago, before we gave any particular attention to newspaper matters. With several other boys we were returning from school. The procession was joined by a wicked truant, who told the rest of us that he had been playing all day instead of attending school. He shrewdly wished to reach home about the same time as the other boys, so that his parents might be less apt to suspect him of anything wrong. When his house was reached the boy's mother—who, of course, had no idea that he had been playing truant—was near the gate. Before she had time to speak her young hopeful greeted her in a most sweet and affectionate tone of voice. What he said was this, "Mother, I've been at school to-day!"

We have thought of the incident many times since, especially when any one, "without sufficient cause," makes a remarkable statement as to how unusually expert or shrewd or honest he is, or what a gigantic business he is doing.

It has been sagaciously remarked that "the enterprising publisher who doubles and quadruples his circulation at the advertising desk, and halves and quarters it in the press-room, has outlived his usefulness." We know that it is ungenerous in the extreme for us to question the statement of a contemporary that evidently admires THE ELECTRICAL WORLD and its business methods so much, still we claim to know something about the newspaper business, and we cannot for the life of us see how its regular issue can be 8,000 copies a week.

If 8,000 copies form the regular edition there must be ample evidence available to establish the fact, such as mail receipts, subscription books, printer's and publisher's affidavits, and the like. We have a great curiosity to see that evidence. We therefore make the following proposition: Let our contemporary prepare and publish sworn statements of the actual number of copies printed of each of its issues during the past three months. If these show that the average number of copies printed has amounted to *eight hundred* copies an issue, we will send a check for $250 to the Telegraphers' Mutual Benefit Association.

This is an opportunity to show just what the circulation of the paper is. It will be noticed that we only stipulate for proof of a circulation of a hundred for every thousand claimed, and that sample copies may be counted the same as those sent to regular subscribers. The proof, however, must be full and explicit. The exact circulation of *each issue* during the three months must be given, under sworn statements by the firm from whom the paper is bought, the printer by whom the editions were run off, the folder and mailer, as well as by the publisher. If the circulation has been what it is claimed to be, there will be no difficulty in obtaining these affidavits, and supplementing them by the weight receipts received from the Post-Office. If our contemporary has the circulation it claims, it certainly ought not to be afraid to satisfy its advertisers and others on the point in the manner we suggest. If it has not, and is positively ashamed to say honestly what circulation it has, we hope it will in future have less to say about circulation, both its own and that of other journals with whom it is unable to compete in a straightforward, business way.

As we have stated at the beginning of this article, we are quite satisfied to go along in our own way, confirming our hold on the subscription and advertising patronage we have already gained, and prosecuting plans for further triumphs. But when extraordinary statements of the kind made by our contemporary flash upon our vision we like to know what can be said in support of them. Hence our modest challenge. We know very well that the circulation of THE ELECTRICAL WORLD can be equaled by that of no other electrical paper in this country or Europe. That circulation is established by all the verification and evidence that advertisers can desire; and in every case our advertisers have been satisfied. Moreover, that circulation and the high standing of the paper justly secure for it a reputation as the leading electrical journal of America. The patronage of advertisers who wish to reach electricians, and to do it thoroughly through the medium of one journal, naturally comes to us, because experience has shown them that this is the part of wisdom, and hence, from no seeking of our own, the advertisements in THE ELECTRICAL WORLD are miscellaneous. That tells its own story as to the great merits of the paper as an advertising medium. Beyond that the subscription list represents the positive value of the paper. No scientific journal on earth can build up a large subscription list without merit; we have a very large list; ergo, the paper is exactly what the reader of electrical literature wants.

GOVERNMENT TELEGRAPHS.

Senator Hill, of Colorado, made a speech in the Senate on the 14th inst. in support of the postal telegraph bill he has introduced. He recalled the fact that the original telegraph line in this country was maintained by the government and then sold to private parties, and he questioned whether there had ever been a more ill-advised piece of legislation than the act of 1846 accomplishing the transfer. That legislation had, he claimed, already cost the people one hundred million dollars, owing to the enormous charges they had had to pay for telegrams. He was forced to admit, however, that the transfer of the British service from private to national management had been a blundering piece of work, causing the people to pay $7,000,000 where $3,000,000 would have sufficed.

Of course the growth of the Western Union Company was passed in review, and the prediction was boldly made that the competitive lines now starting would be short lived. After going over the now familiar and hackneyed arguments, he closed what is said to have been a good speech by saying: "The use of the telegraph is now restricted, by its cost, to extraordinary communications, and by its nature to messages which do not need to be in the hand writing of the sender. Under those conditions, the proportion of telegrams to letters is about one to 30. But who shall say how soon some great discovery, no more wonderful than the telephone, may enable fac simile messages to be sent instantaneously and cheaply over the wires, instead of by the slow and costly process by which they are now transmitted in Europe. If that result shall be accomplished, and it is being earnestly sought by inventors, the post-office will be stripped of its most important business. Every letter which does not require absolute secrecy, or which can be written in cipher, will be taken from the mails and sent by electricity. Drafts will be drawn and balances settled daily by telegraph, and the monopoly which shall have grown up in the control of this business will overshadow not only the post-office department, but the government itself."

The Senate is not as a rule very precipitate in its action, and it may therefore be presumed that nothing will be hurried by that dignified body, in connection with this matter. Meantime we may look for discussion of the subject in the House of Representatives, to whose tender mercies more than one scheme has been committed. Chairman Bingham of the House post office committee is credited with having said: "I would not be surprised if the Edmunds or some other postal telegraph bill is passed by this Congress. There is, of course, considerable opposition to the government taking hold of the telegraphs. There is always more or less opposition to great reforms like this; but, to my mind, there should be no objection to it. Lines of telegraph that may be used by the common public at a reasonable expense should be controlled by the government, and it is only a question of time when it will be done. If delayed by this Congress it will come up in the next Congress, and continue to come up until adopted. I have cast about considerably on the subject, and hear no opposition except from monopolists."

Nevertheless, it may be hoped that the country will not be afflicted with government telegraphs yet awhile.

THE PROPOSED ELECTRICAL CONGRESS.

In our issue of Jan. 5, we stated that it was proposed to have an electrical congress this year at Philadelphia, in connection with the exhibition to be given under the auspices of the Franklin Institute. Since then, Representative Mutchler has introduced a bill in the House authorizing the President to appoint a Commission to conduct an international electrical conference at Philadelphia in the autumn of the present year. This Commission is authorized by the bill to issue invitations to distinguished scientists in this country and Europe, and to determine the scope and character of the conference. It is further authorized to conduct investigations in regard to electricity, before and after the exhibition, and to submit reports thereon. The sum of $25,000 is appropriated for the expenses, and the labors of the Commission are to end in three years from the date of appointment.

It is expected that the bill will pass. As we have before said, the proposal has the support of the most eminent electricians in the country, and is, we think, entitled to it. The holding of the exhibition will bring many foreigners of note to these shores, and should they unite with our own savants in a conference, good results may confidently be expected. We believe, too, that the British Association meets this year at Montreal, and no doubt many of the participants in the proceedings there would be glad to come across the border on scientific errands, or even to learn what kind of men Edison, Brush, Weston, Graham Bell, and Professor Rowland are, in the flesh. By all means let us have the conference, and continue the work of the meetings at Vienna and Paris.

TO DISTINGUISH THE ARTICLES.

It is well-known among electricians that Mr. C. O. Mailloux is the expert of THE ELECTRICAL WORLD and writes for it exclusively. As articles are always read with the greater interest when it is found that they are from his pen, such are now distinguished by having three stars after them, thus ***. Articles in the preparation of which he has assisted, and the views and statements in which it is therefore to be understood by our readers that he indorses, are marked with two stars, thus **. Outside of articles distinguished in one manner or the other as above Mr. Mailloux assumes no responsibility for the contents of the paper.

The Evolution of the Arc Light.

At the meeting of the New York Electrical Society, on the 16th inst., a lecture was delivered by Dr. N. S. Keith on "Electric Lamps and Regulators," before a large and appreciative audience. The lecturer remarked at the outset that the title of his effort would better be "The Evolution of the Arc Light." He dealt with the subject in a very interesting manner, from the early experiments of Sir Humphrey Davy with the voltaic pile. Then, in succession, he called attention to the distinctive features of the various forms devised by experimenters, first, for producing light without regulation; then for regulating the movement or effecting the same by hand to form the arc and preserve it. He went on to show the automatic means of establishing the arc and retaining it as long as the current could flow under the increased resistance of the arc resulting from the combustion of the carbons, and then the means were considered for preserving automatically the length and integrity of the arc. Step by step the lecturer traced the progress made in such automatic regulation of the lamps which were used singly on a single circuit, including the Serrin, Duboscq and Foucault forms. The system of regulating the feed movement by use of the high resistance shunt was next treated, with a glance at the history of its development from the time of La Cassagne and Thiers down to the lamps now made by Brush, Weston, Hochhausen and others; and calling attention to the devices that have for their object to avoid the use of a magnet in the main circuit and in a shunt circuit working in opposition or differentially.

The lecture was profusely illustrated by diagrams—some 25 in number—intended to show the essential electrical features and to subordinate the mechanical combinations, thus keeping the principles involved as free from complexity as possible. The lecture was also supplemented by an exhibition of various lamps made by a number of leading manufacturers, including those of the United States, Excelsior, Fuller and other companies.

In view of the valuable character of this lecture we have made arrangements with Dr. Keith for the production of a condensed report of it, and for the illustration of the report by means of his fine diagrams. This illustrated report will appear exclusively in THE ELECTRICAL WORLD.

Exchange Gossip on Western Union.

Brokers on 'Change have lots of time for chat, now business is so dull. This is one conversation heard on the floor:

"President Norvin Green, of the Western Union, states that the number of shares held for investment is constantly increasing," remarked a prominent trader as he stood in the Long Room of the Exchange. "Well," he continued, with a sly wink, "you know Dr. Green counts all the stock held by Mr. Gould as in the hands of an investor; and, in fact, he does hold on to it pretty well. Wicked people insinuate that he is in the position of the Boniface who was induced to place his thumbs over two holes bored, one on either side of his cask of costliest wine, and with his tongue stop a third hole in the end. If he should let go the effect would be disastrous. There's a difference between holding on to a stock and having it to hold on to you."

"What has become of all the suits against the Western Union company?" inquired one of the group addressed by the trader.

"It was supposed that by Judge Freedman's dissolving the injunction had against the company from holding a meeting of the stockholders to consummate the lease of the Mutual Union the whole matter was disposed of and that the suit of Mr. J. C. Reiff fell through. It now appears, however, that elaborate papers on appeal are prepared and will in due course be considered by the Superior Court, General Term. The feature of these papers is the fact that the chief reasons urged against the lease are those which were urged by Mr. Gould himself against the Mutual Union at a time when he was opposed to it."

Mr. O. H. BOOTH, for many years superintendent of telegraph on the Pennsylvania & Panhandle system, died on Dec. 31 at his home in Mansfield, O.

Prof. Brackett's Energy Meter Anticipated.

To the Editor of The Electrical World:

SIR: I have read with interest, in your issue of Jan. 5, the communication from Prof. Cyrus F. Brackett about his "Energy Meter." There is a mistake about its being new.

Precisely the same idea was reduced to practice early in 1879, in the laboratory of The Fuller Electrical Company, in New York city, by Mr. Geo. W. Fuller, now in Norwich, Conn. Whether it was originated by him or Mr. J. B. Fuller, who died in February, 1879, I cannot now say.

A Fuller dynamo was made so as to be suspended in two bearings whose axial line was coincident with the axis of the armature, and attachments were made for weighing the force necessary to neutralize the attraction of the field magnets and armature for each other, etc.

This apparatus was designed to afford convenient and speedy means for measuring the power consumed in tests of various windings of the Fuller armature and field magnets. The armature consisted of a cast-iron hub having several radial iron arms, which were cores of a like number of bobbins of insulated copper wire. These bobbins were connected in closed circuit with loops to the sectors of the collector, as in the Gramme dynamo. Experiments with this apparatus were made under my supervision.

As this device was only applicable to special constructions of machines, and as there was considerable undesirable friction at the bearings, which were like the journals of ordinary shafting, I devised for the Fuller Company, during the summer of 1879, a platform which was to be suspended from knife-edge bearings, and which could be readily adjusted to the reception upon the platform of various sizes of dynamos and the easy placing of them with the axial lines of their armatures coincident with the line of the knife edges. This platform was to have extension beams for the reception of weights or springs for balancing and weighing. However, I believe these special devices of mine were not made.

This statement of facts is not intended to detract from Prof. Brackett's claim as an *original* inventor, though he may not have been the *first*. The principle is correct and the apparatus is efficient. N. S. KEITH.

NEW YORK, Jan. 10, 1884.

The Elementary Study of Electricity.

To the Editor of The Electrical World:

SIR: Your article in your valuable paper of January 5th, "The Elementary Study of Electricity," strikes me most favorably, and I wish you would devote part of your paper *regularly* (as a matter of necessity) in this very direction. By so doing, and that *repeatedly* only, you will influence the student of electrical science and urge upon him to take up the *elementary* study of electricity, as laying the only proper foundation of this vast field of science. Many of our so-called electricians of to-day, as is well known, have founded their knowledge on the dynamo, telegraph operators on the sounder and key, etc.

An elementary study should not be pursued without practical experimenting, and the study of electrical science guided by actual experimenting is not yet made so much a prominent part in our schools as it is said to be, or thought to be, and by no means as much as *it ought to be*, at our present day. How little have we actually advanced in the study of statical or frictional electricity since Benj. Franklin's time, or since voltaic electricity broke off the pursuance of this study! Even the young student of to-day will almost always declare himself in favor of studying anything relating to galvanic or magnetic force in preference to static electricity. Practical as they are as far as the earning of a dollar is concerned, they rather neglect the undeveloped field and want to operate on a field far more explored.

Why is it not under these circumstances the duty of any scientific mind to urge upon teachers in science and others to pursue the exploration of the vast field at our command —*the study of frictional electricity and a more successful utilization of it in practical life?*

NEW YORK, Jan. 10, 1884. CURT W. MEYER.

The Capacity of the Bernstein Incandescent Lamp.

To the Editor of The Electrical World:

SIR: In an editorial of the *Electrotechnische Rundschau*, Dr. Theodore Stein, editor, there appear the following figures obtained from official measurements made at the International Electrical Exhibitions of Munich and Vienna.

LIGHT OBTAINABLE PER HORSE POWER.

Maxim	109	candles	Munich.
Edison, A	145	"	
Swan	173	"	
Bernstein	292	"	Vienna

The figures of the Vienna commission for the three first mentioned lamps are not given, since it appears that Mr. Bernstein was favored with a special report by his request, but even making a small allowance for improvements made in the interval, there is still a very large margin in favor of Mr. Bernstein's lamp.

If we remember with what a fierce opposition the Bernstein lamp was met on the part of the defunct Gramme "ring" not many months ago, the above figures form a splendid refutation, which Mr. Bernstein has every reason to be proud of.

As your readers will remember, Mr. Bernstein uses a very thin but comparative strong carbon tube for a light-giving body, and his lamp, besides being by far the best according to official measurements, is an entirely new departure in incandescent lighting, dependent on no other patents except those granted to Mr. Bernstein.

The number of the *Rundschau* is No. 3, and is dated December, 1883.

The Gramme "ring" has the floor. E. B.

The Bell-Drawbaugh Suit.

It is natural that great interest should be manifested in the rival claims to priority in inventing the telephone, of Prof. Bell and Daniel Drawbaugh. As stated in our Telephone Department, it is thought likely that the claims will be passed upon in the suit of the Bell Co. vs. the Overland Co., to be heard in Philadelphia on the 21st inst. The following additional intelligence has appeared in the Philadelphia papers: The People's Telephone Company of New York has granted to the Drawbaugh Telephone and Telegraph Company, composed, to a considerable extent, of Philadelphia and Pennsylvania capitalists, all their telephone rights in the States of New York, Pennsylvania, New Jersey, Maryland, Delaware and the District of Columbia. The telephone which the Drawbaugh Company proposes to manufacture and introduce is the invention of Daniel Drawbaugh, of Eberly's Mills, Cumberland county, Penn., claimed to have been discovered several years before the patent of Professor Bell, and to be the original invention of the telephone. The People's Company, as well as the Drawbaugh Company, is under a temporary injunction from the United States Circuit Court, in the Southern District of New York, pending a decision as to the priority of invention. The president of the latter company is Parker C. Chandler, of Boston, and there are associated with him in the enterprise a number of prominent Philadelphians, gentlemen of large means, who have unlimited confidence in the priority of the Drawbaugh inventions, and who propose to proceed vigorously upon this assumption, just as though there were no patented Bell telephone in existence. The contest has thus come to be of peculiar interest to Philadelphians, having resolved itself into a conflict between Pennsylvania claimants upon the one hand and New England vested rights upon the other. B. K. Jamison & Co., the bankers, have been authorized, after the 15th inst., to open subscriptions for a small block of the Drawbaugh stock at a nominal figure. In order to test the confidence of the company in their course a plan of subscription has been determined upon, by which purchasers of stock retain 50 per cent. of their subscription, not to be called until the Drawbaugh rights are established by the refusal of an injunction by the United States Circuit Court for the Southern District of New York.

Wires in Underground Conduits.

On the 10th inst. Mr. W. H. Knight, of Washington, met a number of electricians and representatives of various electrical companies, at the rooms of the Down-Town Association, and explained the Knight and Bentley system of laying wires in a conduit placed under ground. Among those present were Col. Hazard, of the General Committee on Underground Communication; E. N. Dickerson, Alexander Holmes, Mr. Wright, Z. C. Montgomery, of the Brush Company; Major Eaton, of the Edison Company; Mr. Gilman, Jose De Navarro, Mr. Adee, and Gen. C. C. Dodge. A prominent feature of the system is the overcoming of the induction from telegraphic to telephonic wires by the use of a return wire through the conduit. This wire would, it is claimed, counterbalance the induction of the other wires. The electric light wires are placed on the sides of the conduit, and, to prevent the disturbance by induction, the cable containing the telegraph wires crosses and recrosses at regular intervals from one side to the other, thus making a system of balance and average. The conduit would be made of wood or terra-cotta. At frequent intervals along the conduit there would be junction boxes, at which points connection would be made with branch conduits to houses. The wires would be pulled through from one junction box to another and could be taken out without disturbing the pavement. A conduit 2 feet by 2½ would carry 15,000 wires. Every conduit would have a safety cap to prevent disturbance from an abnormal current.

MAGNETIZED RAILS.—According to a statement in French papers a professor in the Faculty of Sciences in Marseilles has lately made some curious experiments on the rails of the lines between Marseilles and Rognac. All the rails laid down for some time past have been transformed at both ends into powerful magnets, capable of attracting and retaining iron keys and even thicker pieces of iron. If the rails are removed they still retain for some time their magnetic force, and eventually lose it but gradually. The magnetic force is only noticeable when the fish-plates have been removed. That such magnetic power should originate in rails is accounted for by the friction produced by the wheels running over the line. This force must necessarily exercise a salutary influence on the stability of the line by increasing the adhesion of the wheels to the rails.

Boston Bereft of Telephone Service.

The city of Boston was deprived of its telephone service for a time, by a fire at 40 Pearl street, the headquarters of the New England Telephone Co., on the 12th inst., and did not till then discover how great a necessity the telephone had become. About 2 A. M. on that day flames were seen bursting from the cupola on the roof of that building. All the outside wires of the company enter the building by means of this cupola, and come together on a large table in the centre of the apartment. The fire was caused evidently by the crossing of an electric-light wire with some of the telephone wires, and the burning table soon communicated the fire to the building. The fire did not go below the fourth floor, but the lower parts of the building were damaged by water. One-half of the third floor is occupied by the New England Company for public offices, and the remainder by the Bell Telephone Company for the storage of telephones. The second floor is used by the executive department of the New England Company. In the cupola, where the fire started, was a large framework, over which run thousands of insulated wires in every direction. Upon this mass of wires the flames ran, burning off the insulating material and leaving the wires bare, so that the whole system, which has been months in arranging, will have to be renewed. In the exchange room, where there are about 40 exchange boards, with all their connections arranged most systematically, the confusion and damage caused by fire and water is considerable.

The exchange boards, which were quite costly, have been rendered useless in many cases, by reason of the destruction of the small electro-magnets which control the drops. So as to insure as good service as before the fire the whole system will have to be renewed, including the connections, the damage to which it is impossible to estimate. Every connection with the 3,000 instruments in the city was destroyed. As nearly as can be judged at present, the damage can be covered by $5,000. There is an insurance of $10,000 placed in different companies, mostly in the Phœnix and Prescott. It is hoped the service will soon be again in perfect working order.

A Cruel Hoax.

Some evil-disposed person started the story that after January 1st the Western Union Company would adopt new message blanks, bearing the following named "conditions":

The public are notified that, in order to guard against mistakes, every message should be repeated and paid for at least four times and a duplicate copy sent by mail.

It is the opinion of the company that the person sending the following message has no rights which the company is bound to respect, and any complaints of errors and delays in the transmission or non-delivery of any message will be treated with contempt.

Messages to all parts of Europe will be promptly forwarded by canal boats from the terminus of our land lines; and it is agreed between the sender of any message and this company that the said sender assumes all risk of said message not reaching its destination within a reasonable number of years.

Any person grumbling at the rate of tolls established by this company, or objecting to any of their rules and regulations, will be put out by the police.

This message has just been received at the principal office, where a reply should be sent. We guarantee the tariff to be as high as that of any other company.

Another Insulator.

Fitch Maynard, proprietor of the Perry Hoxie & Co. machine shops in New London, Conn., has invented an automatic-acting insulator or wire holder for telegraph or telephone wires, which is said to be cheap and to possess many advantages over the old system of stringing or putting up the wires. The invention consists of two blocks of wood, hinged at one end and bound together by a wire latch at the other. In the middle of the blocks, facing each other and making a close joint when the apparatus is shut, are set in two cubes of glass, through which a groove is cut and through which groove the wire passes and is held firmly. One of the pieces of wood is larger than the other and turned down to a round handle so that it may be set into a staple on the telegraph pole. The scheme does away with all wire twisting around the common glass insulators as at present, and it can be operated as rapidly as the mechanical labor of shutting the wires into the machine will admit. Mr. Maynard was to submit it to the Connecticut Telephone Company and to New York parties for inspection.

MOVING A CENTRAL FIRE ALARM OFFICE.—Last month the Quebec (Can.) Fire Alarm Telegraph (central office system) was moved from the second story of No. 1 Fire Station to the third story, under the directions of Mr. L. P. Brunelle, superintendent. During that time fire alarms were received and transmitted without any additional instruments. Those who know the complication of a large system like this in question will appreciate the difficulty of the undertaking.

THE TELEGRAPH.

THE MEXICAN RENAISSANCE.—Great activity prevails in telegraph construction in Mexico. Nearly 12,000 miles of wire are now in operation, and Americans get the lion's share of the work.

THE SLOTH.—"And what is this animal called?" asked a teacher of a class in natural history, as he pointed to a picture of a sloth. And the class all shouted at once: "A messenger boy!"—*Puck.*

A RUSSIAN UKASE.—Boston *Com. Bulletin:* We do not believe in race proscription, but the telephone and telegraph companies have obstructed the streets to that extent that we are compelled to say, "The Poles must go!"

ALONG THE CANADIAN PACIFIC.—Work on the Canadian Pacific, on the north shore of Lake Superior, is progressing rapidly. A telegraph line is about to be established between Sudberry Junction and Port Arthur by spring, thus completing the connection.

WESTERN UNION TAXES IN PENNSYLVANIA.—The Western Union tax case was argued at Harrisburg, Pa., on the 10th inst., before the attorney-general, state treasurer and auditor-general, for the acceptance of the company's offer of $50,000 on the payment of an assessment of $147,000 on stock dividends. After hearing arguments, the proposition was rejected and the case taken to court by the State.

WILLIAMSBURG DISTRICT TELEGRAPH COMPANY.—At a special meeting of the Board of Directors of the Williamsburg District Telegraph Company held at 104 Broadway, Brooklyn, N. Y., on Saturday, Jan. 12, Mr. John C. Orr was elected a director, and subsequently President of the Company in place of C. D Haines, resigned. Mr. Maximilian Fleischmann was also elected a director, to fill a vacancy on the Board. A dividend of 1½ per cent. was declared out of the earnings of the first six months' business, which speaks well for the present management. Mr. Charles Cooper is the Vice-President, and Mr. F. H. Skeele Secretary and Treasurer of the Company.

THE STANDARD MULTIPLEX TELEGRAPH CO.—The certificate of incorporation of the Standard Multiplex Telegraph Company was filed in the County Clerk's office, this city, on the 15th inst. The lines of the new company are to run out of this city, east, west, north and south, throughout the United States. Its capital stock is $2,500,000, divided into 25,000 shares of $100 each. Provision is made for the increase of the capital to $10,000,000. The corporators of the company and the number of its shares held by each are: McLauren F. Pickering, of Boston, 2,583; Wandell Goodwin, of Boston, 2,583; Frederick P. Jones, of Boston, 2,583; Henry D. Manson, of New York, 2,583; Frank W. Jones, of New York, 85; H. W. Jones, of New York, 2,083; Patrick B. Delany, of New York, 6,250; Edward A. Calahan, Brooklyn, 6,250.

THE MONTREAL TEL. CO.—The annual meeting of this company was held on the 10th inst. The report showed the revenue derived from the active or available assets to be $3,192.43; and the assets of the company $165,000. There was a surplus of available assets over liabilities of $31,042, and a surplus of inactive assets over liability of $151,823.85. Mr. Cassils, one of the Directors, reported the lines of the company to be in excellent condition. Sundry extensions of line had been made as called for by contracts existing between the Montreal Telegraph Company and various railway companies. Extensive improvements had been made in the offices at Toronto, Montreal and Quebec, at a cost to the Great Northwestern Company of $12,000. Mr. Cassils, being called upon to give a more detailed statement of the extensions of the company's lines, showed that a total of 360 miles had been added to the company's lines during 1883.

NEW DISTRICT TELEGRAPH COMPANIES.—Certificates of incorporation were filed in New York on the 9th inst. of three different telegraph companies, as follows: The Lowell District Telegraph Company, Manchester District Telegraph Company and Lawrence District Telegraph Company. The lines of each company are to be run from New York across Connecticut to Massachusetts, and thence to Lowell, Mass., Manchester, N. H., and Lawrence, Mass., respectively. Each company is organized with a capital stock of $60,000. Speaking of the local company, the Lowell *Citizen* says: "The stock is not being pressed upon the market. A large portion of it is owned by the telephone syndicate, and comparatively few shares can be bought. When the company is established a local president will be chosen, and George F. Truell, of the New York Mutual District Telegraph Company, will be the local manager. It is expected that everything will be in working order in three weeks. The company has affiliations with those in New York and other large cities." Mr. C. D. Haines, of Haines Bros., New York, is the President.

THE TELEPHONE.

MR. R. G. BROWN has resigned his position with the telephone company in Paris, France. He is now in New York for the purpose of introducing the Gaulard and Gibbs system of electrical distribution.

A CHANGE OF PARTNERSHIP.—Mr. C. F. Holcomb is no longer a member of the firm of J. R. Holcomb & Co., manufacturers of the duplex amplifying telephone, Cleveland, O. The business is now carried on by J. R. and J. D. Holcomb under the old style.

THE ERIE COMPANY'S DIRECTORATE.—It is said that George Byron Chandler, of Manchester, N. H., and Charles R. McLean, of East Boston, will become directors of this company at an early day. Mr. McLean was an opponent of the Erie consolidation scheme.

UNÆSTHETIC POLES.—It is complained that the telephone poles lately put up at Stratford, Ont., are the crookedest that could be found, and that the streets look like a burnt district in the pine woods. We fear that superintendents of construction sin occasionally in this respect of failing to study picturesqueness.

TO INCREASE ITS CAPITAL STOCK.—Mr. C. F. Sise, Managing Director of the Bell Telephone Co., of Canada, has given notice of its intention to apply to the Dominion Parliament for power to increase its capital stock in such form and to such extent as may seem fit, and to amend the Act of Incorporation in other ways.

THE TELEPHONE IN MEXICO.—A dispatch of Jan. 11 from the city of Mexico to the Boston *Herald*, says: "The Mexican Telephone Company has arranged with Pedro Martin, a prominent banker, for the supervision of its affairs here. Martin is a representative of Baring Brothers, is influential with the government, and has been identified with many successful projects. Juan Gutierrez's telephone concession proves worthless, and cannot affect the company."

THE TELEPHONE PATENT SUITS.—It is stated that it is probable that the same issue which is involved in the suit now pending between the Bell and Drawbaugh companies, that is, the priority of invention of Bell or Drawbaugh, may be passed upon in the suit of the Bell Company vs. the Overland Company, which will be heard at Philadelphia on Jan. 21. In this cause the Overland Company has set up three defenses. First—The prior invention of Drawbaugh. Second—The prior invention of Reis. Third—The claims of Baxter, whose patents are owned by the Overland Company. The Bell Company has met the Reis and and Baxter defenses, but has not yet answered the Drawbaugh defense.

THE NEW YORK ELECTRIC LINES CO.—The first annual meeting of the New York Electric Lines Company was held on the 15th at No. 37 Wall street. Directors were elected as follows: Henry A. Gildersleeve, Sidney F. Melbourne, George L. Weed, George S. Hart, Charles Riley, Edward Barr, Silas B. Dutcher and Herbert C. Whitney. Four additional directors are to be selected as soon as pending negotiations with various outside persons are settled. The declared object of the company is to furnish conducting wire for telephone companies. It is stated that negotiations were in progress to supply the Metropolitan Company with a trunk wire.

A GOOD RECORD.—The directors of the Erie Telegraph and Telephone Company met at 40 Pearl street, Boston, on the 14th. The Treasurer's report showed the net earnings of the company for the quarter ending Dec. 31, December being estimated, to exceed $70,000. A dividend of 1 per cent. to stockholders of record Jan. 15 was declared, and the books will be closed from that date till the 26th. The dividend will be paid on the 25th. It amounts to $48,000, leaving a surplus of over $22,000, which, added to a previous surplus, makes a total of $52,000. The surplus will be used for construction purposes. The reduction of the dividend was deemed advisable in order to have a surplus to carry on the extensive growth of the company and pay a portion of its debts. Otherwise some of the treasury stock would have to be sold.

TROPICAL EXTENSION.—The Tropical Telephone Company has, according to the Boston *Herald*, received an offer for its plant and property at Trinidad, W. I., together with a desirable contract for future instruments and supplies which insures a good income and profit. The cash bonus is an increase on the cost, and the royalties include the instruments on hand as well as the future supply. Arrangements have been made to develop the telephone business on the west coast of South America by starting exchanges in four of the principal cities simultaneously. It is thought that the west coast may eventually require as many instruments as the east coast, where (in Brazil) 1000 sets per year are contracted for, besides the Argentine trade, which requires nearly as many more. The company reports a good business in all of its territory, and begins to think about a dividend from earnings.

TELEPHONE CABLES IN WASHINGTON.—An order has been made by the Commissioners of the District of Columbia to the effect that the Chesapeake and Potomac Telephone Company be permitted temporarily to stretch two electric cables on its present poles along New York avenue and 14th street, Washington, from its office to the corner of 14th and L streets northwest, and one cable from the latter point to the alley in square 214, on the following terms and conditions, which shall be accepted in writing by the president of the company before the permit is issued. Then follow the terms—that all cables and cross-arms now on the poles shall be removed therefrom before March 10, 1884, except the two cables named first. Prior to April 25, 1884, the company shall lay under the sidewalks and in the conduit now in course of construction, on 14th street, electric cables or other devices, carrying not less than one hundred wires, to be at least equal for underground communication to the standard underground cables, and before May 25, 1884, the overhead cables and the poles on 14th street, between New York avenue and L street, shall be removed.

THE AFFAIRS OF THE MEXICAN CENTRAL CO.—The Boston *Transcript* recently published the following news relating to the Mexican Central Telegraph and Telephone Company, which will be of interest: Actual increase of the business in its five exchanges for the month of November, as compared with October, was—Increase in subscribers, 23; increase in central office calls, 1,460; increase in net profits, $206.09; actual net profits over and above all expenses of operating, royalties and construction and management, $250.08. An exchange has just been started at Aguas Calientes, a flourishing city where the Mexican Central Railroad has located its repair shops, and where the warm mineral springs will probably attract many visitors. The Mexican Central Company controls by contract with the Mexican Telegraph Company the States of Zacatecas, San Luis Potosi, Aguas Calientes, Queretaro and Guanajuato—five of the most promising States in the Republic, containing eighteen or twenty cities of from 5,000 to 75,000 population. Exchanges are in operation and on a self-sustaining basis (as the last returns show) at San Louis Potosi, Zacatecas, Queretaro, Leon, Guanajuato, Guadaloupe, Siola, Vetagrande and Aguas Calientes. The Mexican Central Company owns by direct purchase the telephonic rights of Professor Bell and Francis Blake, including rights to patent their inventions and collect all royalties received from the American Bell Company on United States goods sent to Mexico. Patents are obtainable and will be applied for soon, covering the entire Republic. The right to a permanent contract with the American Bell Company will be asked for Feb. 1, when the present contract, under which the Mexican Telephone Company gets its interests, will expire and the right to export telephones of United States manufacture to Mexico will belong to the Mexican Central Company, which will become the source of supply to the Mexican Telephone Company, *its* parent. As the contract of the Mexican Central Company with the Mexican Telephone Company obliges the latter to supply the former with United States telephones at five dollars per year rental, at a cost to the Mexican Telephone Company of $7.40 per set, it will be interesting to notice whether the tail will wag the dog, or vice versa.

THE ELECTRIC LIGHT.

THEATRE ROYAL, MONTREAL.—It is the intention of the managers of this theatre to have the building illuminated by the electric light.

A "DIM RELIGIOUS LIGHT" NOT WANTED.—It is reported from England that the grand old Westminster Abbey will hereafter have the electric light.

WANT TO KNOW WHY.—Electric lights in use at Nashville, Tenn., have been given up by the city authorities, and the local papers want to know why. The restoration of the electric lights is demanded.

THE CONSOLIDATED CO., PORTLAND, ME.—This company purchased at Portland on the 8th inst. a large block of real estate, for a central light station, between Plum and Union streets. The price paid was $12,000.

FOR DUDISH ELECTRICIANS.—The price at Nuremberg, Germany, of a breastpin containing an Edison glow-light, fed by a small vest pocket battery, is put at $9 only. There may be a future beyond the dreams of avarice, for the manufacturer of these novelties, even at that low figure.

THE COST OF THE LIGHT IN BOSTON.—Mayor Martin, of Boston, in a late address states that an electric light costs $237.25 per annum; a gas light $34, and each electric light displaces on an average 3½ ordinary street lamps. The mayor approves of the use of electric lights on public squares, but questions, on account of the cost, their general use for street lighting.

THE AMERICAN ELECTRIC LIGHT CO.—A dispatch from Boston states that Francis P. Adams and others have filed a bill in equity against the American Electric Light Company and Fred. D. Grant, of New York, and others, directors of the company praying for an account as to the disposition of its stock, an especially as to the transfer of a large quantity of the stock t Eugene M. Hersey.

BROOKLYN STILL BEHIND THE AGE.—Brooklyn is a "slow city, in spite of its proximity to New York. It has been content to do without elevated railroads and rapid transit thus far, an it is almost entirely a stranger to the electric light. Mayor Low has now vetoed the resolution passed by the aldermen, giving the People's District Electric Lighting Co. permission to take possession of a number of streets in the Eastern District of the city, in which they were to have the right to erect poles and wires in order to carry on their business.

MORE OF NAKED TRUTH, LESS OF NAKED WIRES.—It is thus the Philadephia *Ledger* relieves itself: Just as long as electric light companies and their representatives declare that there is no danger in naked wires carrying currents capable of overcoming the resistance of as many as forty arc lights, they may expect to be met with facts, frequently exaggerated, that go to disprove their assertions. It has been clearly enough proved that two can play at the game of exaggeration, and it is only a game, after all. It would be better to give it up and return to facts and to business.

UNEQUALED FOR EXPLORING CAVES.—For prolonged and minute exploration of caves *La Lumière Electrique* speaks very enthusiastically of the adaptability of the electric light: "Under a dome hung with curiously entangled stalactites the rays from the regulators are so arranged as to pierce the darkness of the galleries and variously formed arches and give the fantastic place a strange brightness, the crystallizations on the walls taking on a surprising iridescent lustre, and the damp stratum that covers the whole being transformed into a marvelous varnish." Hitherto "for making a prolonged excursion into the different parts of a cave, for examining its galleries and chambers, and for getting an exact plan of it, or for studying the constituent elements of its walls, none of the means employed in modern times has been found practical, or at least sufficient."

GERMAN PRECAUTIONS AGAINST FIRE.—The following rules of safety against all dangers likely to accrue from electric lighting have been adopted by the leading German fire offices: (1.) *Arc lamps* must not be put up in places in which inflammable or explosive solid or gaseous materials are to be found, or may possibly get mixed up with the air. In all other places arc lamps may be applied; but when materials likely to take fire are lodged or manufactured in such places it becomes imperative to inclose the lamps in globes or lanterns, sealed up below with an ash tray. In those places in which open arc lamps may be used it is yet essential that an ash tray of at least eight inches in diameter should be put below the lamp. (2.) *Incandescent lamps* may be put in any place; yet whenever and wherever inflammable or explosive solid or gaseous materials are in existence, or may get mixed up with the atmosphere, each lamp must have a glass globe around it, within which the connection between the conductor and the lamp is to be placed.

MUCH ADO ABOUT NOTHING.—It was reported the other day from Boston that a big fraud had been attempted upon the revenue, in connection with an importation of incandescent lamps. The matter is, upon investigation, very easily explained. By a strict construction of the statute, there was, in the case referred to, a large undervaluation. But the government officials most conversant with the case assert that there was manifestly no intention to defraud. The facts of the case are stated briefly, as follows: Some Boston parties purchased in Europe the Gray electric light patent, and with the patent contracted for 75,000 incandescent lamps. There were 25,000 of these lamps imported in one lot, the whole being honestly invoiced at the cost price, which was very low by the terms of the contract, the main consideration of the trade being the patent itself. The customs authorities, noticing the very low invoicing of the lamps, insisted on duties at the full market, rather than the invoice, value. The case wac appealed, and the strict construction of the revenue officers affirmed, so that the importers had to pay an additional duty of $6,858.72. The remainder of the lamps were never imported, and those already brought over, being, it is alleged, found practically useless, were sent back.

MISCELLANEOUS NOTES.

THE BRUSH STORAGE SYSTEM IN MEXICO.—Charles F. Brush the American electrician, has been granted a patent for 10 years by the Mexican government for his system of accumulating and storing electricity.

A GOOD SEASON FOR POLES.—Mr. Wm. Brownlee, of the firm of Brownlee & Co., of Detroit, was in New York last week. He reports that a better quality of poles is being got out this Winter than usual. Messrs. Brownlee & Co. do a large business in telegraph, telephone and electric light poles.

ANY AFFINITY TO JERSEY LIGHTNING?—Ripening and purifying wines and strong liquors is done by the Electric Liquor Company, of California, by means of an electric current. By this process the liquor is freed from all its poisonous essential oils, and the work of from three to six years is done in a few hours. Light clarets are treated from three to six hours; brandy requires sixty.

THE MEXICAN CABLE CONCESSION.—A published statement that Gen. Grant's cable concession, granted by the Mexican Government, had been forfeited by that government on the ground of non-fulfillment on the part of the Cable Company of its obligations, has led to a misapprehension as to Gen. Grant's connection with that enterprise. The facts, as given by a friend of Gen. Grant, are as follows: This concession was given to the General, not as a matter of personal interest to himself, but for the Western Union Telegraph Company. That company, having ascertained that existing contracts made it undesirable to pursue the enterprise, allowed the concession to lapse. It is stated that Gen. Grant refused all offers of compensation for or interest in this concession, and that the same is true of his connection with other enterprises in Mexico with which his name has been coupled. The General in all cases has uniformly refused to accept any compensation for his services in the establishment of these enterprises. He has been anxious to see closer commercial relations established between the two countries, and to accomplish this has given much time and attention to it.

STOCK QUOTATIONS.

Telegraph, telephone and electric light stocks were quoted as follows on Wednesday at the Electric Manufacturing and Miscellaneous Stock Exchange, and at the Stock Exchange:

TELEPHONE.—American Bell, a 176, b 178; Bay State. b 90, a 97; Boston & Northern, b 90, a 100; Central American, b 115; Continental, b 2, a 15; Dolbear, b 5, a 10; Erie, b 37; Hudson River, b 60, a 90; New York and New Jersey, b 75; New York and Pennsylvania, b 75; National Bell (new), b 65, a 90; Overland, b 5; People's, b 9, a 11; Shaw, b 10, a 17; Southern New England, a 175; Suburban, b 100, a 110; Southern Bell, b 95, a 125; Tropical, b 1.55, a 1.56.

TELEGRAPH.—Postal Telegraph (stock), b 4.50; Postal Telegraph Bonds with stock, b 55, a 58; Postal Telegraph Bonds ex stock, b 49, a 49.50; Postal Telegraph (new Co.), b 2.50; Western Union Telegraph, b 72¾, a 72⅞; Bankers and Merchants' Tel., b 122, a 122¼; Am. Tel. & C. Co., b 58, a 59½.

ELECTRIC LIGHT.—American, b 3.50; Brush, b 50, a 65; Brush Illuminating, b 48, a 65; Daft, a 85; Edison, b 170; Edison Illuminating, a 65.50; Edison Isolated, b 100; Edison, European, b 2, a 15; Excelsior, a 35; Fuller Electrical, b 10, a 28; Swan, a 89; United States, b 60, a 95.

BUSINESS NOTICES.

GOLD RINGS.—All should carefully read the advertisement of the Standard Jewelry Co., manufacturers of goods from the precious metals, whose advertisement appears in another column.

ELECTRICAL SUPPLIES AND ENGINEERING.—Estimates for electrical supplies and engineering contracts will be furnished on application by J. Chester Wilson, 802 Chestnut Street, Philadelphia. He is agent for the State of Pennsylvania for the Portable Electric Gas Lighter.

THE NOVELTY ELECTRIC CO.—A notification has been issued by the Penn Electrical Co., No. 1102 Walnut street, Philadelphia, to the effect that they have disposed of their good will and the exclusive right to manufacture and sell their patent electric gas-lighting apparatus to the Novelty Electric Co., Fifth and Locust streets, Philadelphia, and have retired from business, closing their offices.

A. L. BOGART.—We call attention to the advertisement in this issue of A. L. Bogart, the electrician, of 22 Union Square, New York. He is a patentee and manufacturer of every variety of electric gas lighting apparatus for public and private buildings, and supplies all kinds of electric apparatus, such as burglar alarms, annunciators, batteries and coils. He furnishes a list of the patents issued or assigned to himself for multiple and single hand gas-lighting apparatus, from the year 1869.

A. M. PIERCE'S PATENT AGENCY.—Mr. A. M. Pierce, 82 Astor House, New York city, has made a study of patents and patent law in all its branches for many years, and offers to inventors the use of his experience as a patent lawyer and mechanical expert. He issues, in the form of a miniature patent, with tape and seal, a pamphlet of advice and instructions to all who are of an inventive turn of mind. All communications relating to patents will be cheerfully answered by him.

PHOTOGRAPHS OF THE HAVANA TELEPHONE EXCHANGE.—It would pay any telephone man to take a trip to Havana, Cuba, to see the construction of the exchanges at that place. For the benefit of those who cannot spare the time for this trip a set of photographs have been taken and are mounted on a card 22 × 14 inches, and contain the views of the two cupolas with their respective fixtures, the two switch-boards, and the officers of the company at Havana. Every exchange manager should have one. They can be obtained from Mr. Geo. M. Phelps, Jr., Secretary and Treasurer of the Cia Electrica de Cuba, at the Company's office, No. 62 New Church street, New York.

OUR ILLUSTRATED RECORD OF ELECTRICAL PATENTS.

PATENTS DATED JAN. 1, 1884.

Bracket for Electric Lamps; H. Edmunds, Jr., of New York City, Assignor to Thomas J. Montgomery, of Boston, Mass..... 291,171

This bracket is designed to conceal the conductors, and to allow the arms of the bracket to be turned in the same manner as a gas bracket without breaking the circuit.

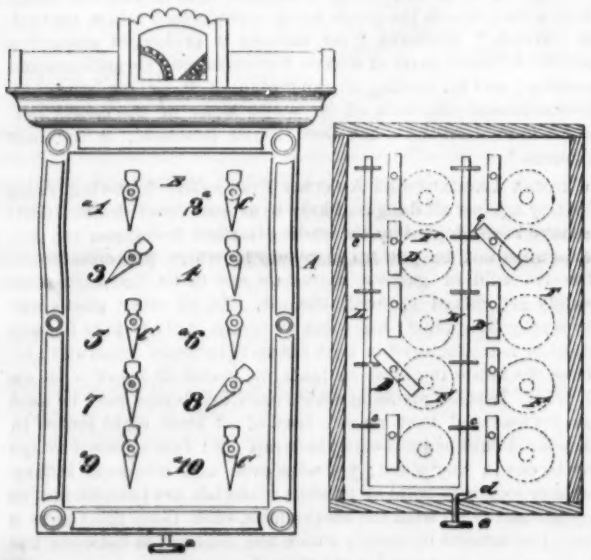
Case for Electric Conductors; Henry Edmunds, Jr., of New York City, Assignor to Thomas J. Montgomery, of Boston, Mass..... 291,170

This invention consists in combining with the covered and insulated conductor of a two-part metallic case, divided longitudinally so that one part may be secured to the wall, admitting of laying the wires in place before putting on the covering.

Exciting Circuit for Dynamo-Electric Machines; Charles Lever, of Bowdon, County of Chester, England..... 291,209

A series dynamo-electric machine, with shunt electric-arc lamps arranged in series, and a shunt or derived circuit having a resistance equal to the lamps, and through which the current passes for the purpose of exciting the dynamo, are combined with a circuit-breaker for breaking the shunt-circuit when the dynamo has excited itself, and causing the current to pass through the lamps.

Electric Annunciator; A. E. Leitch, of Dayton, O., Assignor of one-half to Charles A. Phillips, of same place..... 291,063



Whenever a current of electricity is sent through any of the electro-magnets *F*, its corresponding permanent magnet *D* will be attracted, and the index-needle *C* attached thereto will be made to point to its number upon the face of the case, and thereby indicate at what point the button was pressed. The needle will continue to point to the number after the current is cut off, as the permanent magnet will adhere to the core of the electro-magnet. In the figures two of the needles are thus shown pointing to their numbers and with their permanent magnets in contact with the electro-magnets.

To reset the needles it is only necessary to push up the button *e*, which, lifting the tripping-rods, causes their detents or shoulders *c* to come in contact with the upper ends of the permanent magnets, and turning them on their pivots break their magnetic contact with the cores of the electro-magnets.

Railway Train Signal Apparatus; Charles Selden, of St. Louis, Mo..... 291,099

The object of this invention is to provide a means whereby the bell or other signal on the engine may be operated either by the opening of an electrical circuit or by the ordinary bell-cord extending through the train, the arrangement being such that the electrical operation of the bell does not interfere with the mechanical control over it by the devices ordinarily employed.

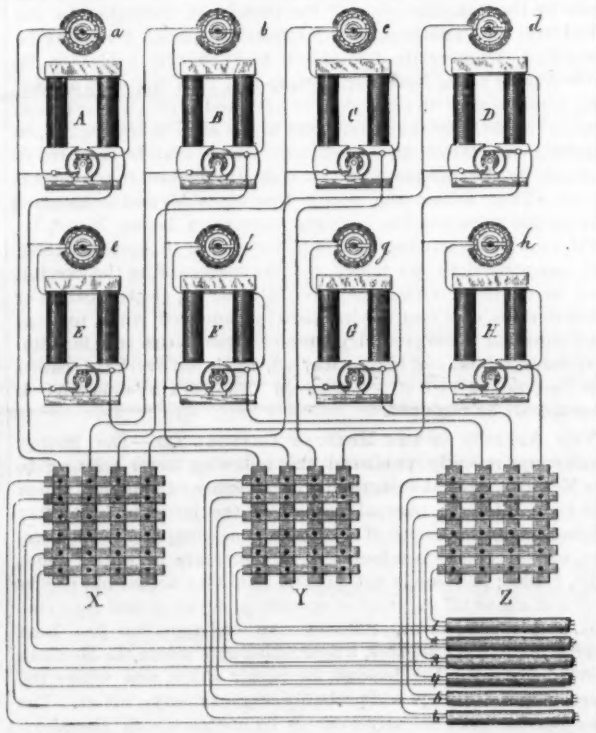
Electric Battery; J. L. Tobin, Newark, N. J..... 291,241

The zinc plate of this battery is provided with two resilient arms, which hold it at any desired elevation.

System of Electric Distribution; Charles S. Bradley, of New York City..... 291,141

In the engraving, which represents a central generating station, the invention is illustrated as applied in the case of a multiple-arc system arranged on the triple-conductor plan, such as that described in Letters Patent to Edison, granted March 20, 1883, and numbered 274,290; but this invention is equally applicable to any other arrangement of current supplying conductors. In the triple conductor plan the current is supplied to the lamps or other converting devices by three sets of conductors, instead of by two, two of the sets respectively forming the positive and negative conductors, between which is maintained an electro-motive force of double that required to feed one lamp, and the third forming an intermediate or "compensating" conductor, between which and each of the others is maintained an electro-motive force sufficient to feed one lamp or half that between the positive and negative conductors. Each feeder, therefore, which connects the central station with the triple system of mains consists of three conductors, separately connected with the three corresponding conductors of the mains.

The claim covers a method of regulating the electro-motive



force or pressure in a multiple-arc system of current-supplying conductors or mains, consisting in conveying the current to different points of the mains by means of feeders supplying the feeders with electric currents by independent sources of electrical energy, and separately regulating their electro-motive forces, so as to maintain different pressures in the various feeders, according to the conditions of the load.

Telegraph-Wire Joint; Charles McIntire, of Newark, N. J..... 291,211

In this telegraph wire joint, a partition is adapted to separate the wires, and has soldering-openings allowing the entrance of solder to both chambers at the same time.

Zinc for Batteries; H. J. Brewer, New York City.. 291,286

This is a zinc for Leclanche batteries having a thread cast in the zinc at one end for receiving a nut to bind the battery wire.

Electric Fire-arm; A. T. Brown, Syracuse, N. Y., assignor of one-half to L. C. Smith, of same place..... 291,288

The cartridge is exploded by a spark from an induction coil carried in the stock.

Protector for Telephone and Telegraphic Instruments; A. A. Connolly, Washington, D. C..... 291,299

This instrument responds only to abnormal currents and is designed to ground such currents.

Duplex Telegraph; S. D. Field, New York City.... 291,318

Meter for Electric Circuits; P. G. Russell, Washington, D. C..... 291,405

Turning the switch which controls the current winds the spring or weight employed to propel the meter.

Method and Apparatus for Regulating the Electrical Transmission of Power; Edward Weston, of Newark, N. J., Assignor to the U. S. Electric Lighting Co., of New York City..... 291,445

The field of the generator is excited by a current of normally constant electro-motive force, and this currrent is regulated by a variable counter-current.

Electric Gas Generator; C. E. Ball, of Philadelphia, and C. S. Bradford, Jr., of Westchester, Pa., Assignors to said Ball..... 291,463

This apparatus is designed for electrically generating hydro-carbon gas.

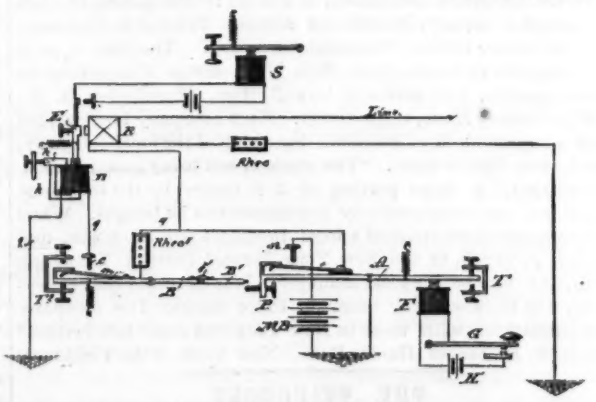
Support for Filaments of Incandescent Lamps; J. S. Beeman, of London, England..... 291,464

A pendent piece is fitted to the inner surface of the top of the globe to embrace and support the filament.

Secondary Battery Regulator; J. S. Beeman, Wm. Taylor and Frank King, London, England..... 291,465

A regulator plate of comparatively small storage capacity and an elastic diaphragm operated by gas generator on this plate, together with a contact breaker operated by the diaphragm, constitute this invention.

Static Neutralizer for Telegraphs; Charles Selden, of St. Louis, Mo..... .....291,096, 291,097



The object of this invention is to neutralize the disturbing effects of the static discharge-current from a telegraph line, which occurs simultaneously with the removal of main battery from line and the putting of the line to earth, and which is productive of false signals on the receiving instrument at the transmitting end of the line.

It is designed more particularly for application to duplex or multiplex telegraphs.

At some portion of each complete movement of the transmitter, in putting the main battery to line and withdrawing it from line, the local battery is connected to the condenser, the connection of the auxiliary coils with the condenser and battery being at such time broken. Simultaneously, however, with the withdrawal of the main-line battery and the connection of the line to earth, the condenser is connected to the auxiliary local coils in a local circuit, so as to discharge through the coils the connection of the condenser with said local battery being broken simultaneously with or immediately previous to the connection of the condenser with the auxiliary coils.

The operation of making and breaking the local connections of the local battery, condenser and auxiliary coils is effected automatically by any suitable devices working simultaneously with the movements of the transmitter.

Telephone Transmitter; Daniel Drawbaugh, Eberly's Mill, Pa., assignor to the People's Telephone Co., of New York.....291,311, 291,312 and 291,472

These patents cover new and simple forms of transmitter, employing semi-conductors as means of varying its current.

Underground Telegraph System; S. D. Field, New York City..... 291,317

Insulated conductors are placed in sealed conduits and surrounded with dry carbonic acid gas.